
Q272-GR-P-2020
June 12, 2020

Group Report

Inventorship of inventions made using Artificial Intelligence

by Jonathan OSHA, Reporter General
Anne Marie VERSCHUUR, First Deputy Reporter General
Ari LAAKKONEN, Second Deputy Reporter General
Ralph NACK, Lena SHEN and Guillaume HENRY
Assistants to the Reporter General

Responsible reporter: Ralph NACK

National/Regional Group or Independent Member

Germany

Contributor's names

Florian Beck, Anselm Brandi-dohrn, Heiko Dumlich, Jochen Ehlers, Stephan Freischem, Wieland Groth, Dietmar Haug, Sonja Mross, Harald Numrich, Melanie Pfeuffer, Stefan Schohe, Matthias Sonntag, Tillman Taruttis, Michael Wallinger, Markus Rieck

e-Mail contact

markus.rieck@fuchs-ip.eu

I. Current law and practice

1. What are the requirements to be considered an inventor of a patented invention in your jurisdiction? When this Study Question is referring to “your law” or “your jurisdiction”, please note this is intended to be inclusive of both statutory law and case law.

Every natural person – independent of its legal capacity to exercise one’s right – that performed the creative act of invention can be considered as an inventor in both the German and European jurisdiction.

The EPC

The contribution to the invention required for being considered (co-)inventor in the European jurisdiction is determined by institutions of the member states of the European Patent Convention (EPC) and is not harmonised. It is agreed in the case laws of the member states of the EPC that bare manual participation in a minor function and the execution of orders are generally not sufficient for being considered (co-)inventor. An own creative contribution to the invention, on the other hand, is generally considered to be sufficient for being considered (co-)inventor.

German law

According to German case law, (co-)inventor is everyone who provided a creative contribution to the invention which neither has to be inventive on its own nor has to fulfil all requirements of a patentable invention. The contribution, however, has to be creative and not bare manual participation or technical support.

Inventorship of inventions made using Artificial Intelligence

2. Assuming valid inventorship, does your law include provisions concerning the naming of the inventor of an invention? If yes, please briefly explain.

Yes

The EPC Each inventor has the right to be mentioned as such before the European Patent Office (EPO). The European patent application shall designate the inventor. The designation shall state the family name, given names and full address of the inventor, and in cases where the applicant is not the inventor, the designation shall contain a statement indicating the origin of the right to the European patent and bear the signature of the applicant or his representative. If the Office notices that a European patent application lacks mentioning an inventor, the Office shall give the applicant an opportunity to correct this deficiency. If no valid designation is filed, ultimately the application will be refused. German law According to German statutory law, the applicant has to designate the inventor. The designation shall include given name, family name, full address of the inventor, the affirmation that no further inventors contributed to the invention. In case that the applicant is not the (sole) inventor, the designation shall include a statement indicating the origin of the right to the German patent. Furthermore, the designation shall indicate the title of the invention and if available the application number, and it shall bear the signature of the applicant or his representative, and in case of multiple applicants the signature of each of the applicants or their representative. If the Office notices that a designation of the inventor is missing, the Office shall give the applicant an opportunity to correct this deficiency. If no inventor is validly designated, ultimately the application will be refused.

3. Does your law, including any regulations or official guidelines, provide any specific guidance or rules on inventorship of inventions made using AI?

No

Regulation Neither the EPC nor the German Patent Act (PatG) contains any regulation that positively refers to inventorship of inventions made using AI. Official guidelines and other guidance of the patent offices The EPO has further explained the patentability requirements for inventions in the field of AI (see EPO guidelines under G. II. 3.3, 3.3.1, first published in 2018), but inventions made using AI have not been covered. The German Patent Office's (GPTO) guidelines (version 2019) do not specifically refer to the particularities of inventions made using AI. However, it is the general (and publicly announced) understanding of both, the EPO and the GPTO that a patent on an invention created using AI cannot be granted, if no human being is named as the inventor. The EPO further took a number of initiatives to improve the understanding and legal certainty in the area of AI patenting and inventorship. Among them is an academic study on exactly this question that has been prepared by Dr. Noam Shemtov of Queen Mary University of London, which basically finds that an inventor must always be a natural person.

4. Under your law, is it possible for an AI entity to be considered an inventor or co-inventor in a patent application? If yes, please explain.

No

Under both, German law and the EPC, only a natural person can be an inventor because both jurisdictions implicitly require that an inventor has legal personality. An AI entity does not have legal personality and, thus, cannot be considered as an inventor or co-inventor in a patent application. European patent applications: In the EPC, there is no explicit legal provision that defines which entities may be regarded as inventors. However, there are several regulations defining the rights of an inventor. According to the EPC, the right to a European patent shall belong to the inventor or his successor in title. The inventor has the right to be mentioned vis-à-vis the applicant for or proprietor of a European patent. Furthermore, the inventor has the right to be designated in a European patent application and the inventor shall be mentioned in the published European patent application and the European patent. An AI entity has no legal personality so that it cannot have any of the above rights. As a consequence, an AI entity cannot be regarded as an inventor. This is also confirmed by two recent decisions of the EPO with regard to patent applications EP 18 275 163 and EP 18 275 174. According to those decisions, the European patent applications were refused because a machine was designated as the inventor. German patent applications: Analogously to the EPC, German patent law does not explicitly define the legal requirements for being an inventor. However, German patent law has essentially the same legal provisions with regard to the rights of an inventor as the EPC. Particularly, the inventor or his successor in title has the right to the patent. Moreover, the inventor shall be designated in a German patent application and his name shall be mentioned in the published patent application and patent specification. An AI entity does not have legal personality so that it cannot be a bearer of the above rights. Hence, it cannot be considered as an inventor.

5. Under your law, is it possible to name an AI entity as an inventor or co-inventor in a patent application? If yes, please explain.

No

It is not possible to name an AI entity neither as an inventor nor as a co-inventor. This is true for German patent law and the EPC. German law: The German patent law prohibits the patent office from examining the merits of the inventor designation. Its capacity to examine the inventor designation is limited to formal aspects. However, according to GPTO practice, an AI entity cannot be an inventor (see above) so that it considers any inventor designation naming an AI entity as the only inventor not an inventor designation. The patent office would consider any inventor designation naming an AI entity as an inventor or co-inventor formally deficient. As a consequence, the office would refuse the patent application in the absence of a formally correct inventor declaration. However, the office will not examine whether the named inventor is a natural person. The EPC: Like the GPTO, the EPO refuses applications naming AI entities as inventors on formal grounds.

Inventorship of inventions made using Artificial Intelligence

6. In connection with a hypothetical patentable invention made using AI, which of the following contributions by one or more human contributors could be considered under your law as being at least co-inventorship of an invention made using AI?

In each case, please explain why or why not. Please note this question does not consider inventorship of the AI itself; only inventorship of an invention made using the AI.

The following answers to the questions 6a) to 6f) relate to German law as the EPC does not have any rules for determination of inventorship but leaves it to the laws of the contracting states.

Answer 6a): At present, there is no generalised guideline on how to determine (co-)inventorship in German law, particularly in cases of joint inventorship where different persons are involved in the inventing process. According to German case law, (co-)inventor is everyone who provided a creative contribution to the solution of the problem to be solved by the invention. The contribution neither has to be inventive itself nor has it to fulfil all requirements of a patentable invention. Rather, it is decisive whether the individual contribution has influenced the overall inventive performance, i.e. whether it is not insignificant with regard to the inventive solution. For this purpose, the created invention and its genesis must be taken into consideration and on this basis it must be determined whether and to what extent and in what manner the individual has contributed to the invention. Further, said contribution must be an intellectual one that has to be provided autonomously, i.e. without the specific guidance by other persons. In case AI is being used as a (software) tool to help invent and the intent for the output produced by the AI lies with one or more human contributors, the decision to use a specific AI (software tool) and/or the use of the AI to achieve a specific objective may be considered as being (co-) inventorship, when the resulting contribution to a patentable invention is of the type of product or process intended. The decisive factor is, however, if the contribution is considered intellectual and creative, which has to be decided on a case-by-case-basis. It must be assessed in the individual case whether the individual contribution (the decision to use a specific AI and/or the use of AI to achieve a specific intended objective consequent to this decision) has influenced the overall inventive performance, i.e. whether it is not insignificant in relation to the solution. This is not the case, if the decision to use the AI and/or the use of the AI for the intended objective did not require any individual intellectual activity, e.g. if the AI was commonly used in the respective field and/or for the intended objective, or if this decision was the consequence of the direction of another party, as may be the case of a superior giving instructions to a subordinate to use AI or to use it for a specific purpose. Mere routine work such as starting the AI and reading the output according to the instructions of an inventor or a third party, i.e. without an autonomous decision to use a specific AI to achieve a specific objective in accordance to the above principles, is not sufficient. A different assessment is conceivable if the one or more human contributors, for example, change the parameters of an artificial neural network during purposive use to achieve a specific objective.

Answer 6b): In case AI is being used as a (software) tool to achieve a particular intended objective but arrives at an unintended and unforeseen result, the decision to use AI and/or the use of the AI (but to achieve a different objective) may not be considered as being (co-)inventorship. In order to establish (co-)inventorship and in particular the personal right of an inventor which derives from the creation of the invention and is intended to ensure the recognition of the inventor's honour, the one or more human contributors have to provide an intellectual and creative contribution to the technical teaching, i.e. a qualified input with respect to one or more elements of the invention that are a part of the solution of a technical problem. When assessing whether a contribution is considered intellectual and creative, in principle, case law does not impose strict requirements (particularly in cases where it would otherwise not have been possible at all to identify an inventor). For example, a person that has provided the theoretical groundwork from which the technical teaching is ultimately developed may be considered (co-)inventor. What is imperatively required, however, that the subject matter of the invention, i.e. the solution of the technical problem to be solved by the invention, is to a certain extent the outcome of an individual intellectual activity, i.e. the contribution must contain at least a minimum of purposive customization or selection, while merely abstract contributions are not sufficient.

Inventorship of inventions made using Artificial Intelligence

This is not the case, if the element ultimately contributing to the invention was not intended or foreseen by the person who provided the contribution but came about by chance. Therefore, it becomes apparent that the decision to use AI and/or the use of the AI may not be considered as being (co-)inventorship, when the outcome that made a contribution to the invention was not an original objective of the decision to use and/or the use of the AI.

Answer 6c): Whether designing or contributing to the design of the AI algorithm that is used in (a) or (b) may be considered as being (co-)inventorship is to be answered in accordance to the above principles. A (co-)inventor has to provide a part of the solution of the technical problem, i.e. has to contribute to the technical teaching in a way that is not insignificant for the overall success of the invention and that is considered intellectual and creative. In particular, a contribution may establish (co-)inventorship, even if the significance for the invention was recognized later and by someone else. The act of designing or contributing to the design of the AI algorithm may only provide an eligible contribution and establish (co-)inventorship, if the specific AI algorithm was the result of purposive activity and not insignificant to achieve a specific objective related to one or more elements of the invention. Mere routine work such as converting the instructions of an inventor or a third party into a computer-suitable algorithm is not sufficient to establish (co-)inventorship.

Answer 6d): The same answer as in (c) is applicable to the steps of selecting the data or the source of the data that is used to train the AI algorithm that is used in (a) or (b). The act of selecting the data or the source of the data that is used to train the AI algorithm may only provide an eligible contribution and establish (co-)inventorship, if the specific selection of the data or the source of the data was not insignificant for the overall success of the invention, i.e. to obtain a suitably trained AI algorithm to achieve a specific objective related to one or more elements of the invention. In the other case, i.e. that any selection or a standard, straight-forward selection of data for training the AI algorithm was used, then probably no eligible contribution may be attributed to this step.

Answer 6e): The same answer as in (c) is applicable to the steps of generating and selecting the data or the source of the data that is input to a trained AI algorithm used in (a) or (b). The act of generating or selecting the data or the source of the data that is input to the trained AI algorithm may only provide an eligible contribution and establish (co-)inventorship, if the generation or selection was not insignificant for the overall success of the invention, i.e. to achieve a specific objective related to one or more elements of the invention.

Answer 6f): The selection process from a large number of outputs produced by the AI and recognising it to be a patentable invention may establish (co-)inventorship. Again, it depends on whether or not the step of selecting can be qualified as an individual and creative contribution. The general considerations for qualifications of contributions to an invention apply here also. Mere routine work such as reading the output is not sufficient.

7. Assuming an invention was made using at least a minimum amount of AI contribution during the inventive process at any stage, would this be considered as a red flag under your law leading to an exclusion of the patentability of the invention as a whole? Please briefly explain.

No

Apart from commercial applicability, the patentability criteria are related to the average person skilled in the art, in particular his understanding of the prior art and what this average person skilled in the art could and would have done at the application or priority date, using the then available general knowledge and technical means. The capacities of the inventors do not matter nor does the way how the invention came about. Thus, use of AI as a tool that contributes during the inventive process does not lead to an exclusion from patenting just like use of other tools (e.g. analysis devices) contributing to identifying an invention does not prohibit patenting.

II. Policy considerations and proposals for improvements of your Group's current law

8. According to the opinion of your Group, is your current law regarding inventorship of inventions made using AI adequate? Please briefly explain.

No

Inventions made using AI can be divided in two groups: inventions with at least a minimum of individual and creative human contribution (AI assisted inventions) on the one hand, and inventions made solely by AI without any individual and creative human contribution (AI generated inventions) on the other hand. Neither the European Patent Convention nor the German Patent Act contains any regulation that positively refers to inventorship of inventions made using AI, be it AI assisted or AI generated inventions. Attribution of rights The German Patent Act attributes the initial right to the patent to the (co-)inventors. The principle of attribution is based on the individual and creative achievement of a natural person. A legal person can only acquire the invention as a derivative legal successor of a natural person. In case of AI generated inventions, the invention could no longer be attributed to a natural person. Neither German law nor the EPC contains any regulation as to who should initially own such an AI generated invention. Therefore, incentive and reward for investment in research and development might no longer be given. It follows that current law is not adequate for AI generated inventions. A scenario in which the contribution of individuals is seemingly minute, and several people may qualify as co-inventors is neither specific for AI nor unusual. In certain fields of technology, research and development is based on a systematic evaluation of all possible options of a general idea and basically consists in identifying those options that lead to the desired result. This is essentially what AI does at the current state of technology, albeit automatically and without the involvement of humans. In cases where the innovation essentially relies on know-how that is made public by the patent application for the first time, the contribution of individuals in the sense of the current practice may likewise be small. It also has to be stressed that the requirements of intellectual and creative input in order to establish (co-)inventorship have been reduced by the courts in cases where it would otherwise not have been possible at all to identify an inventor. If the invention is patentable and involves an inventive step, the only question that remains to be answered is who should be entitled to the invention, not whether anyone should be entitled to the invention at all. Although questions regarding inventorship of inventions made using AI might be difficult to answer, the current law and practice, asking for the contribution of natural persons, provides an adequate and appropriate mechanism to assign rights in technical innovation. Legal practice in Germany and the EPC over the past decades shows that the current provisions and case law provide adequate and satisfactory solutions to the problem of attributing rights in a patentable invention. Scenarios of AI assisted inventions; especially the scenarios discussed in the context of question 6 are not fundamentally different and can be treated by the same principles so that current law is adequate for AI assisted inventions. Inventor designation AI assisted inventions allow for the designation of at least one human inventor. For AI generated inventions, it will not be possible to name a human inventor. The EPO and the GPTO will both reject the patent applications because of a formally deficient inventor declaration. Further, it must be emphasised that the GPTO does not verify the declaration of the applicant concerning the inventor. In order to speed up the procedure, in which the Patent Office would be overburdened with an examination of the substantive justification, the applicant is considered to be entitled and the enforcement of the inventorship is up to the true inventor. Currently, the applicant of an AI generated invention, would have to name a human inventor to avoid rejection of the application. Apart from the question whether a false declaration entails criminal liability or not, the fiction of the authorization of the first applicant for the invention must not lead to the fact that inventions are attributed to a person who did not contribute to the technical teaching at all on a regular basis. This would contradict the objective justification of the exclusive right under patent law and the principle of the freedom of information in the public domain. Hence, current law is adequate for AI assisted inventions, but it is not adequate for AI generated inventions because the patent application will be rejected on formal grounds for the sole reason of being AI generated. If the legislator decides to exclude AI generated inventions from patentability, this should be done in an explicit regulation and not on the basis of a formality.

9. According to the opinion of your Group, would recognition of an AI entity as an inventor or co-inventor conflict with the public policy issue of fostering innovation (you may also refer to other general patent law doctrines under your law, if applicable)? Please briefly explain.

No

Patents may foster innovation for different reasons. Patents may incentivize research and development with the prospect of a legal monopoly. Competitors may be encouraged to develop alternative technology to avoid an existing patent. Patent law also makes inventions available to the public. The second and third aspect would not change, if an AI entity was considered an inventor or co-inventor. Regarding the first aspect, an AI entity will not respond to the incentive that a monopoly entails. Hence, the question of whether recognizing AI inventorship will conflict with the public policy issue of fostering innovation is linked to the initial attribution of the rights in the invention. As pointed out in the answer to question 8, attribution of rights in AI generated inventions is not adequately addressed in current law. The rights in an AI generated invention might for example be attributed to the developer of the AI, or its user. If the initial right in the invention was given to the user, the user would be incentivized to use the AI for making inventions. Thus, recognizing AI as an inventor in itself would not conflict with fostering innovation.

10. In your jurisdiction, what is the purpose of naming the inventor in the patent application? Does the naming of the inventor in the patent application, if applicable, consider aspects of personal rights under your law, e.g., does it fulfill a reward function for personal effort? Please briefly explain.

DE

German patent law grants the inventor the right to be named. The right of the inventor to be named (or also not to be named) as inventor is derived from the inventor's personal right, substantiated by the creation of the invention.

The naming of the inventor is an explicit legal manifestation of the general right to free development of personality from Article 2 (1) in conjunction with Article 1 of the Constitutional Law for the Federal Republic of Germany (GG). In particular if the inventor is not the applicant, the right to be mentioned shall give expression to the right of the inventor to recognition of the inventorship (respect for the inventor).

EP

Likewise, the EPC grants the inventor a right to be named as inventor. The right to be mentioned as inventor is an effect of the inventor's personal right, which is recognised in many contracting states.

11. According to the opinion of your Group, would the recognition of inventorship by an AI entity conflict with or undermine the purpose of naming the inventor in the patent application you identified in question 10? Please briefly explain.

Yes

DE The naming of the inventor according to the German Patent Act is understood as a legal manifestation of the general right to free development of personality substantiated by the Constitutional Law for the Federal Republic of Germany (GG). Article 1 of the Constitutional Law relates explicitly to humans, so that with the currently prevailing arguments no right to be named as inventor can be substantiated for an AI. EP The inventor's personal right means all entitlements to personal rights, which are attributed non-transferably to the inventor as the author of the invention by virtue of his personality. The EPC follows this tradition of natural law. No personality and also no right to a personality are attributed to an AI, so that here too an AI can claim no entitlement to be named as inventor from considerations of personal rights.

III. Proposals for harmonisation

12. Do you consider international harmonization regarding inventorship of inventions made using AI as desirable? Please briefly explain.

If YES, please respond to the following questions without regard to your Group's current law or practice. Even if NO, please address the following questions to the extent your Group considers your Group's current law or practice could be improved.

Yes

Since the right to the patent in principle belongs to the inventor, international harmonization regarding the inventorship of inventions made using AI is desirable. If not harmonized, the right to the patent is likely to belong to different persons in different countries, or inventions made using AI could be patentable in some countries while they are not patentable in others.

13. What should be the requirements to be considered an inventor or co-inventor of an invention made using AI?

In order to be considered an inventor or co-inventor of an invention made using AI, an own creative contribution to the invention should be required. An own creative contribution should be more than bare manual participation or technical support.

Simply providing and/or training an AI algorithm which is used for making various inventions in a technical field should not be sufficient for being considered as a (co-)inventor, if the contribution to the invention was neither intended nor foreseen. However, if the AI algorithm is provided and/or trained for a purpose that ultimately makes a contribution to an invention, the person that provided and/or trained the AI algorithm should be considered as an (co-)inventor according to the established criteria applied by the case law.

14. Should an AI entity, for example when considered as an “artificial person”, be considered an inventor or co-inventor of an invention made at least in part by contribution from the AI entity assuming the same contribution, if made by a human inventor, would be considered inventorship under applicable patent law?

No

Under current law, an AI entity is not considered as an inventor or co-inventor of an invention, even if a human being would be considered as an inventor or co-inventor under the same circumstances. This is because in many national/regional legislations, including German and European Patent Law, it is clearly indicated that the right to a patent shall belong to the inventor or his successor in title. This regulation implies that an AI entity which cannot be a bearer of rights is not capable of being an inventor or co-inventor. The above principle that an inventor needs to have legal capacity is firmly established and should not be changed in the future. Hence, an AI entity should not be considered as an inventor. Mechanisms for protecting AI generated inventions should be provided in order to incentivize investments of companies in creating innovations made by AI. This might be achieved by an adaptation of patent law or alternatively by a new protective right for mere AI inventions outside the framework of patent law. In both cases, there is a need to establish regulations with respect to the ownership of the protective right or patent resulting from a mere AI invention. Additionally, in case that patent law is adapted, the obligation of naming the inventors in German and European patent applications needs to be abolished or amended for AI generated inventions.

15. If AI is considered an inventor or co-inventor of an invention made using AI, should it be possible to name AI as an inventor or co-inventor in a patent application?

No

In case of an allowance of AI entities as inventors, the designation of the inventors in a patent application shall include – besides the names of the human inventors (if any) – the notice that the invention was generated under the participation of AI. The name of the AI software used for generating an invention is not regarded as a useful information in a patent application. Instead, in order to provide the information about the origin of the AI software, the manufacturer of the AI software should be indicated in the patent application in combination with the information how the applicant has acquired the right to the patent resulting from the AI software.

Inventorship of inventions made using Artificial Intelligence

16. In connection with a hypothetical patentable invention made using AI, which of the following contributions by one or more human contributors should be considered under your law as being at least co-inventorship of the invention made using AI? In each case, please explain why or why not. Please note this question does not consider inventorship of the AI itself; only inventorship of an invention made using the AI.

The answers below refer to the answers to questions 6a) to f). It is the opinion of the group that the principles established under the current law regarding human contribution to an invention are adequate.

Answer 16a): Current law and practice as outlined in answer 6a) are adequate for establishing whether a contribution to an invention is sufficient for (co-)inventorship in case AI is used as a software tool.

Answer 16b): Current law and practice as outlined in answer 6b) are adequate for establishing whether a contribution to an invention is sufficient for (co-)inventorship in case use of AI resulted in an invention not directly related to the intended goal.

Answer 16c): Current law and practice as outlined in answer 6c) are adequate for establishing whether a contribution to an invention is sufficient for (co-)inventorship in case of designing an AI algorithm or contributing thereto.

Answer 16d): Current law and practice as outlined in answer 6d) are adequate for establishing whether a contribution to an invention is sufficient for (co-)inventorship in case training data or source of data is selected.

Answer 16e): Current law and practice as outlined in answer 6e) are adequate for establishing whether a contribution to an invention is sufficient for (co-)inventorship in case input data are generated or selected for training the algorithm.

Answer 16f): Current law and practice as outlined in answer 6f) are adequate for establishing whether a contribution to an invention is sufficient for (co-)inventorship in case selecting an output by AI and recognizing it to be a patentable invention.

Inventorship of inventions made using Artificial Intelligence

17. If an invention was made using at least a certain level of AI contribution during the inventive process should the invention be excluded from patentability as a whole? If yes, what would be the minimum level of AI contribution to trigger this exclusion? Please briefly explain.

No

Under existing German patent law (de lege lata), no exclusion from patentability would be triggered, because a certain level of AI contributed during the inventive process. While it is worthwhile to consider whether it should be stipulated by statutory law (de lege ferenda) that a solution to a technical problem should not be considered an invention, if it is obtained predominantly by AI, we do not see any actual need for an exclusion from patentability for this scenario. It is our view that the use of AI should not be treated differently than the use of any other tool during the process of developing and/or conceiving an invention, which does not trigger an exclusion from patentability. One may conceive a concern that a solution, which would be considered a ground-breaking invention today, due to the use of AI in the future may have to be considered obvious and thus not patentable. It is our view, though, that this assumption would not justify a general exclusion from patentability for AI assisted or AI generated inventions. Rather, for the assessment of inventive step one might have to take into consideration what AI is capable to provide, i.e. the capabilities of AI used in the relevant technical field.

18. Please comment on any additional issues concerning any aspect of inventorship of inventions made using AI you consider relevant to this Study Question.

Respondent skipped this question

19. Please indicate which industry sector views provided by in-house counsels are included in your Group's answers to Part III.

Views from the electronics industry were considered.
